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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/719,526	12/13/2000	Kazuhito Hatoh	10059-368US	8925

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2005 MARKET STREET, SUITE 2200  
PHILADELPHIA, PA 19103-7013

EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 04/04/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/719,526

Applicant(s)

HATOH ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Response to Amendment*

1. This Office action addresses claim 1, which remains rejected herein for the reasons of record. Accordingly, this action is made final.

### *Claim Rejections - 35 USC § 103*

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 6-132038 in view of JP 9-204924, in further view of WO 95/25357.

In the abstract and Figure 1, JP 6-132038 teaches a fuel cell stack comprising a unit cell composed of a polymer electrolyte membrane (2), catalyst layers (3, 4), and separator plates having gas passages (6, 7). Total heat exchangers (11, 21) for concurrently moving heating and humidity from discharged gases toward the incoming fuel and oxidant gases are present in the system (see paragraph [0018] of the machine translation).

JP 6-132038 does not expressly teach the presence of end plates on the fuel cell stack, or that the total heat exchangers are located inside the end plates (i.e., within the fuel cell stack). The reference also does not expressly teach that the heat exchangers comprise polymer electrolyte membranes which are the same as those in the unit cells, or the thicknesses of the membranes. Finally, the reference does not expressly teach the presence of current collector or insulating plates in the stack.

JP 9-204924 is directed to a solid polymer fuel cell stack having a humidification unit (11) contained within the endplates (16) of the stack (see abstract, Figure 10). The reference

further teaches polymerized “dummy” (i.e., insulating) plates (15) in paragraph [0016] and Figure 10. The reference further teaches in paragraph [0013] that “the solid-state polyelectrolyte layer[s]” are used in the humidifiers.

WO 95/25357 is directed to a fuel cell stack comprising a humidification section. The stack comprises bus (i.e., current collector) plates (46, 48) at the edges of the active section (see Fig. 3).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of JP ‘924 to incorporate the total heat exchangers of JP ‘038 into (i.e., between the endplates of) the stack of JP ‘038. In paragraph [0018] of the machine translation, JP ‘924 teaches that “by uniting with the stack of a power generation area in the humidification area of a fuel cell, the gas humidifier of PEM type fuel cell of this invention can perform the above-mentioned humidification technique accurately, and it can attain miniaturization of a fuel cell while operation by which the fuel cell was stabilized can be performed.” Accordingly, this disclosure would motivate the artisan to incorporate the total heat exchangers of JP ‘038 between the endplates of the stack of JP ‘038.

Furthermore, the artisan would be motivated to incorporate the dummy (insulating) plates of JP ‘924 into the fuel cell stack of JP ‘038 to prevent unwanted electrical contact of the fuel cells with the humidification units and/or endplates. Accordingly, this limitation is also not considered to distinguish over the references.

Regarding the limitation that the heat exchangers comprise polymer electrolyte membranes which are the same as those in the unit cells, as noted above, paragraph [0013] of JP

'924 teaches that solid polymer electrolyte layers are used as water transport membranes in the heat exchangers. The artisan would be motivated to use these membranes in the total heat and humidity exchangers of JP '038 because of their recognized suitability in humidity exchangers. Furthermore, the thickness of the membranes is a parameter that is recognized by the prior art as being a result-effective variable. The artisan would have motivation to make these membranes as thin as possible in order to reduce the diffusion distance of the water and to achieve a reduction in volume. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Finally, the artisan would be motivated to incorporate the current collector plates of WO 95/25357 into the fuel cell stack of JP '038 in order to facilitate the collection and withdrawal of electrical current in the stack. Accordingly, this limitation is also not considered to distinguish over the references.

### ***Response to Arguments***

3. Applicant's arguments filed January 21, 2003 have been fully considered but they are not persuasive. Applicants first assert that "this advantage, which is not taught or suggested by JP '924, eliminates any temperature drop that would otherwise occur as the fuel and oxidant gases proceed toward the PEFC." In response, it is submitted that it is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); MPEP §2144. Further, it is believed that

the prior art fairly suggests the combination on its own merits, without the benefit of hindsight. As set forth above, JP '038 discloses a stack, but with the humidity exchangers utilizing input and output reactant streams located outside the stack. As also set forth above, JP '924 discloses a stack having humidifiers utilizing cooling water streams inside the stack. JP '924 teaches that by combining the humidifier section with the power generation section in the stack, the stack performs accurate humidification and can be miniaturized while maintaining a stable output. It is noted that JP '038 is also concerned with miniaturization (see line 3 of the abstract). Thus, the artisan would have a reasonable expectation of success in applying the teachings of JP '924 to the system of JP '038. In other words, since both references are concerned with miniaturization, the artisan could look to the disclosure of JP '924 for guidance on how to achieve further miniaturization of the system of JP '038. Thus, as exemplified by JP '924, incorporating the humidification units of JP '038 into the stack of JP '038 would be an obvious way to achieve this miniaturization.

Regarding the JP '924 reference, Applicants assert that "the term 'uniting' is overly broad and, therefore, insufficiently describes the information necessary to motivate an artisan to effectively incorporate the heat exchangers of JP '038 between the end plates of the stack of JP '038." In response, it is asserted that the Figures of JP '924 clearly convey that the term "uniting" is to be construed as incorporating the humidifiers into the cell stack. It is further submitted that JP '924 lays out a clear structural "blueprint" for making the above-noted modifications to JP '038, since the humidifiers of the two references are structurally similar except for the fluids that pass through them (cooling water in the case of JP '924).

Finally, Applicants assert that “such *prima facie* obviousness is sufficiently overcome by Applicants’ improved an unexpected results such as demonstrated, for example, in Example 1 of the present application.” The Examiner acknowledges the showing of these results, but in the absence of a comparison to the prior art structure, such results are not sufficient to overcome the *prima facie* case of obviousness. There does not appear to be any data in the specification to which the asserted results can be meaningfully compared. Thus, in the absence of such a comparison to the closest prior art (i.e., the system of JP ‘038), the rejection is maintained.

### ***Conclusion***

4. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 1746

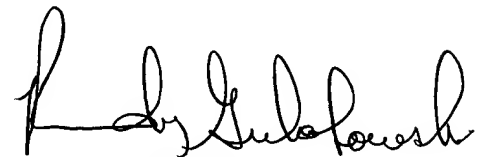
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 305-5408 or (703) 305-5433.

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

April 1, 2003

A handwritten signature in black ink, appearing to read 'Randy Gulakowski', is written over a printed name and title.

RANDY GULAKOWSKI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700